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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/075,054

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Nabil R. Yousef

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12/14/2005

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EXAMINER

FILE, ERIN M

ART UNIT

PAPER NUMBER

2634

DATE MAILED: 12/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. <span style="float: right;">X</span>	Applicant(s)	
	10/075,054	YOUSEF, NABIL R.	
	Examiner	Art Unit	
	Erin M. File	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on 03 November 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-69 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,7,8,15-20,28,31-36,40,42-47,50,51,58-61,63,64,68 and 69 is/are rejected.
- 7) ☒ Claim(s) 3,5,6,9-14,21-27,29,30,37-39,41,48,49,52-57,62 and 65-67 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments filed November 3, 2005 have been fully considered but they are not persuasive.
2. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the use of a shorter training sequence used repeatedly to create a modified packet) are not recited in the rejected claim(s). **Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims.** See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

The applicant contends that in the Agazzi reference (US 2002/0060827)

"In Agazzi, there is no teaching at all of using anything in addition to the "training sequence" to train the "nonlinear channel estimator 1305". Agazzi does not teach or disclose using the training sequence portion and anything else (e.g., a data portion) to train the "nonlinear channel estimator 1305". Also, there is no teaching at all of using anything more than "a training sequence" (e.g., anything more than "1" training sequence). Agazzi does not teach or disclose anywhere the use of "multiple training sequences" or "repeated training sequences" in training the "nonlinear channel estimator 1305".

To respond to this Claim the examiner will look specifically at the limitations of Claim 1.

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*a channel estimation block that is operable to estimate a characteristic of a communication channel;*

Element 1305 of figure 13 of Agazzi meets this requirement.

*a channel equalizer block that is operable to calculate a plurality of channel equalizer tap coefficients, the plurality of channel equalizer tap coefficients being used to equalize for any communication channel-induced changes within the received signal;*

The feedback block 1305 includes a nonlinear channel estimator employing a lookup table as illustrated in FIG. 4 or the Volterra Kernel approach as illustrated in FIG. 5.

([0083]).

*and wherein **at least one** of the channel estimation block and the channel equalizer block performs repeated adaptation (emphasis added);*

In practice, a training sequence may not be required because the decisions 1307 of the decision feedback equalizer 1300 and the nonlinear channel estimator 1305 may still converge ([0084]). If the decisions converge, they inherently must converge from repeated adaptations.

*the channel estimation block being operate to employ repeated adaptation on the training sequence portion and the data portion, the repeated adaptation of the channel estimation block being performed using a plurality of channel estimation cycles; and the channel equalizer block being operable to employ repeated adaptation on the training sequence and the data portion, the repeated adaptation of the channel equalizer block being performed using a plurality of channel equalizer cycles.*

The applicant contends here that the Agazzi reference fails to meet this limitation

because Agazzi fails to disclose repeated adaptation on the training sequence portion

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and the data portion simultaneously. However, the broadest interpretation of this limitation only requires repeated adaptation on the training portion and the data portion. It is not required that these processes occur simultaneously. Therefore, Agazzi who discloses repeated adaptation of a training sequence ([0083], also see [0091]) or a data sequence ([0084]) meets this limitation.

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 2, 4, 7, 8, 17-20, 28, 31, 34-36, 40, 42, 45-47, 50, 51, 60, 61, 63, and 64 are rejected under 35 U.S.C. 102(e) as being anticipated by Agazzi.

**Claim 1, 17, 18, 34, 45, 60**, Agazzi discloses a method of estimating and equalizing a receiving channel in which a received channel is estimated (fig. 13, 1305) with already known training signals ([0083], lines 29-30) and equalized (1300). The channel estimation block models the channel based on a look-up table that is able to repeatedly

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adapt to the characteristics of the channel through update functions with a decision feedback equalizer ([0092]). The look-up table coefficients can effectively function as tap coefficients in the equalizer. The use of channel estimation to remove errors induced by the channel from the signal is an obvious purpose of channel estimation to one skilled in the art.

**Claims 2, 46**, inherit the limitations of Claims 1, 45, respectively, further Agazzi discloses the channel estimator (fig. 14B, 1433) repeatedly estimates the channel and uses this information to determine the coefficients of the look-up table (1435).

**Claims 4, 28, 40, 47, 61**, Agazzi further discloses equalizer coefficient identification can be determined by the transmitter sending a training sequence known a priori to the receiver. The nonlinear channel estimator (fig. 13, 1305) can then be trained using the known training sequence. ([0083])

**Claims 7, 31, 42, 45, 50, 63**, Agazzi further discloses his non-linear equalizer (fig. 13, 1300) is a decision feedback equalizer ([0083]).

**Claims 8, 19, 35, 36, 51, 64**, inherit the limitations of Claims 1, 18, 34, 35, 45, 60 respectively, further, Agazzi discloses a shift register (fig. 4, 407) which stores the input bits, comprising both training bits and data bits, which are used in determining the equalizer coefficients.

**Claim 20**, inherits the limitations of Claim 19, further Agazzi describes a channel estimation model in figure 4 in which input bits containing both data and training symbols (fig. 4, 401) are stored in shift register (407) and used for the channel estimation.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 15, 16, 32, 33, 43, 44, 58, 59, 68, and 69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Agazzi and in further view of Fulgham et al.

**Claims 15, 32, 43, 58, 68**, inherit the limitations of Claims 1, 17, 34, 45, 60, respectively, Agazzi fails to disclose his system used within the context of a transceiver, however Fulgham discloses a transceiver (fig. 1, 40) which uses both channel estimation ([0022], line 8) and equalization ([0006], line 2). It would be obvious to one skilled in the art at the time of invention to use Agazzi's equalization method in

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Fulgham's invention because both inventions use soft decoding to equalize a received data channel.

**Claims 16, 33, 44, 59, 69**, inherit the limitations of Claims 1, 17, 34, 45, 60, respectively, Agazzi fails to disclose his receiver is contained within one of a base station receiver, a mobile receiver, a tower receiver, and a high definition television set top box, however Fulgham discloses his transceiver contained within a mobile terminal ([0022]). It would be obvious to one skilled in the art at the time of invention to use Agazzi's equalization method in Fulgham's invention because both inventions use soft decoding to equalize a received data channel.

5. Claims 3, 5, 6, 9-14, 21-27, 29, 30, 37-39, 41, 48, 49, 52-57, 62, and 65-67 are objected to as dependent upon rejected claims, but would be allowable if rewritten in independent form.

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any



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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erin M. File whose telephone number is (571)272-6040. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (571)272-3056. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Erin M. File

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12/09/2005



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